What is claimed is:

1. A method for isolating a single polymeric molecule comprising:
(a) contacting polymeric molecules with agents under conditions that permit formation of agent-polymeric molecule complexes, said polymeric molecules immobilized at binding positions on a substrate, said agents comprising a binding partner having binding affinity for a label of the polymeric molecules, and said binding positions separated by at least about two times the length of the polymeric molecules; and,
(b) releasing at least one of the agent-polymeric molecule complexes from the substrate to isolate a single polymeric molecule.

2. The method of claim 1, wherein the agents are microsphere beads having a coating comprising the binding partner.

3. The method of claim 1, further comprising washing the substrate to remove the agents which have not formed the agent-polymeric molecule complexes.

4. The method of claim 1, wherein the substrate is selected from the group consisting of gold substrates, aluminum substrates, glass substrates, silicon substrates, and polymeric substrates.

5. The method of claim 1, wherein the label is biotin and the binding partner is selected from the group consisting of avidin and streptavidin.

6. The method of claim 1, wherein the label is an antigen and the binding partner is an antibody for the antigen.

7. The method of claim 6, wherein the label is digoxigenin and the binding partner is anti-digoxigenin antibody.

8. The method of claim 1, wherein the polymeric molecule is a nucleic acid.

9. The method of claim 8, wherein the nucleic acid is a double stranded nucleic acid.

10. The method of claim 8, wherein the nucleic acid is deoxyribonucleic acid.

11. The method of claim 8, wherein the nucleic acid is ribonucleic acid.

12. The method of claim 1, wherein the polymeric molecules comprise a first oligonucleotide, and the binding positions comprise a second oligonucleotide, which is complementary to at least a portion of the first oligonucleotide.

13. The method of claim 12, wherein the polymeric molecules are immobilized by hybridizing the first oligonucleotide to the second oligonucleotide.

14. The method of claim 1, wherein the releasing is selected from the group consisting of heating, adding a pH adjusting compound, and adding a disrupting agent.

15. The method of claim 2, further comprising transporting the at least one agent-polymeric molecule complex.

16. A method for isolating a single polymeric molecule comprising:

(a) providing an agent-polymeric molecule complex having only one bound polymeric molecule;

(b) immobilizing the agent-polymeric molecule complex to a substrate at a position having a binding position that interacts with at least a portion of the polymeric molecule; and,

(c) releasing the agent-polymeric molecule complex to isolate a single polymeric molecule.

17. The method of claim 16, wherein the agent is a microsphere bead having a coating comprising a binding partner having binding affinity for a label of the polymeric molecule.

18. The method of claim 16, wherein the substrate is selected from the group consisting of gold substrates, aluminum substrates, glass substrates, silicon substrates, and polymeric substrates.

19. The method of claim 17, wherein the label is biotin and the binding partner is selected from the group consisting of avidin and streptavidin.

20. The method of claim 17, wherein the label is an antigen and the binding partner is an antibody for the antigen.

21. The method of claim 20, wherein the label is digoxigenin and the binding partner is anti-digoxigenin antibody.

22. The method of claim 16, wherein the polymeric molecule is a nucleic acid.

23. The method of claim 22, wherein the nucleic acid is a double stranded nucleic acid.

24. The method of claim 22, wherein the nucleic acid is deoxyribonucleic acid.

25. The method of claim 22, wherein the nucleic acid is ribonucleic acid.

26. The method of claim 16, wherein the polymeric molecule comprises a first oligonucleotide, and the binding position comprises a second oligonucleotide, which is complementary to at least a portion of the first oligonucleotide.

27. The method of claim 26, wherein the immobilizing comprises hybridization of the first oligonucleotide to the second oligonucleotide.

28. The method of claim 16, wherein the releasing is selected from the group consisting of heating, adding a pH adjusting compound, and adding a disrupting agent.

29. The method of claim 17, further comprising transporting the agent-polymeric molecule complex.

30. The method of claim 16, wherein the providing comprises removing the polymeric molecules on the agent-polymeric molecule complex that are not immobilized to the substrate.

31. A method for isolating a single polymeric molecule comprising:
(a) introducing a mixture comprising agent-polymeric molecule complexes into an applied electric field, said mixture including agent-polymeric molecule complexes having varying numbers of polymeric molecules bound to the agents; and,
(b) separating the agent-polymeric molecule complexes having only one bound polymeric molecule from the mixture based on mobility to isolate a single polymeric molecule.

32. The method of claim 31, wherein the agents are microsphere beads having a coating comprising a binding partner having binding affinity for a label of the polymeric molecule.

33. The method of claim 32, wherein the label is biotin and the binding partner is selected from the group consisting of avidin and streptavidin.

34. The method of claim 32, wherein the label is an antigen and the binding partner is an antibody for the antigen.

35. The method of claim 34, wherein the label is digoxigenin and the binding partner is anti-digoxigenin antibody.

36. The method of claim 31, wherein the polymeric molecule is a nucleic acid.

37. The method of claim 36, wherein the nucleic acid is a double stranded nucleic acid.

38. The method of claim 36, wherein the nucleic acid is deoxyribonucleic acid.

39. The method of claim 36, wherein the nucleic acid is ribonucleic acid.

40. The method of claim 31, further comprising determining the mobility of an agent-polymeric molecule complex having only one bound polymeric molecule under the applied electric field.

41. A microfluidic device comprising:

(a) a micromold comprising a chemically inert material and having a top surface, a bottom surface, a sample inlet, a sample outlet, and a microchannel pathway defined between the sample inlet and the sample outlet;

(b) a substrate adhered to the bottom surface, the substrate having binding positions for immobilizing polymeric molecules, said binding positions separated by at least about two times the length of the polymeric molecules; and,

(c) a heating element adapted to heat the substrate.

42. The microfluidic device of claim 41, wherein the micromold comprises a silicone material.

43. The microfluidic device of claim 41, wherein the microchannel has a width between about 10 microns and about 200 microns.

44. The microfluidic device of claim 41, wherein the microchannel has a length between about 0.25 centimeters and about five centimeters.

45. The microfluidic device of claim 41, wherein the binding positions comprise a polymeric molecule.

46. The microfluidic device of claim 45, wherein the polymeric molecule comprises a thiol-modified oligonucleotide.

47. The microfluidic device of claim 45, wherein the polymeric molecule comprises a labeled oligonucleotide.

48. The microfluidic device of claim 45, wherein the heating element comprises a thin-film resistive heater.

49. The microfluidic device of claim 48, wherein the heating element is the substrate.

50. The microfluidic device of claim 45, further comprising a passivation layer between the substrate and the heating element.

51. The microfluidic device of claim 50, wherein a first pattern formed by the resistive heater is different from a second pattern formed by the substrate.

52. The microfluidic device of claim 51, wherein the first pattern and the second pattern intersect at locations, thereby providing individually addressable binding positions.

53. A microfluidic device comprising:

(a) a micromold comprising a chemically inert material and having a sample well, a first end, a second end, and a microchannel pathway defined between the first end and the second end; and,

(b) a first electrode disposed proximate to the first end and a second electrode disposed proximate to the second end.

54. The microfluidic device of claim 53, further comprising a collection chamber having a third end and a fourth, collection end, the collection chamber being substantially transverse to the microchannel.

55. The microfluidic device of claim 54, further comprising a third electrode disposed proximate to the third end and a fourth electrode disposed proximate to the fourth, collection end.

56. The microfluidic device of claim 53, further comprising a switching circuit between the first electrode and the second electrode.

57. The microfluidic device of claim 56, further comprising a power supply operatively connected to the switching circuit.